TECHNOLOGY DEPT.

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A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XLVII
No. 1213

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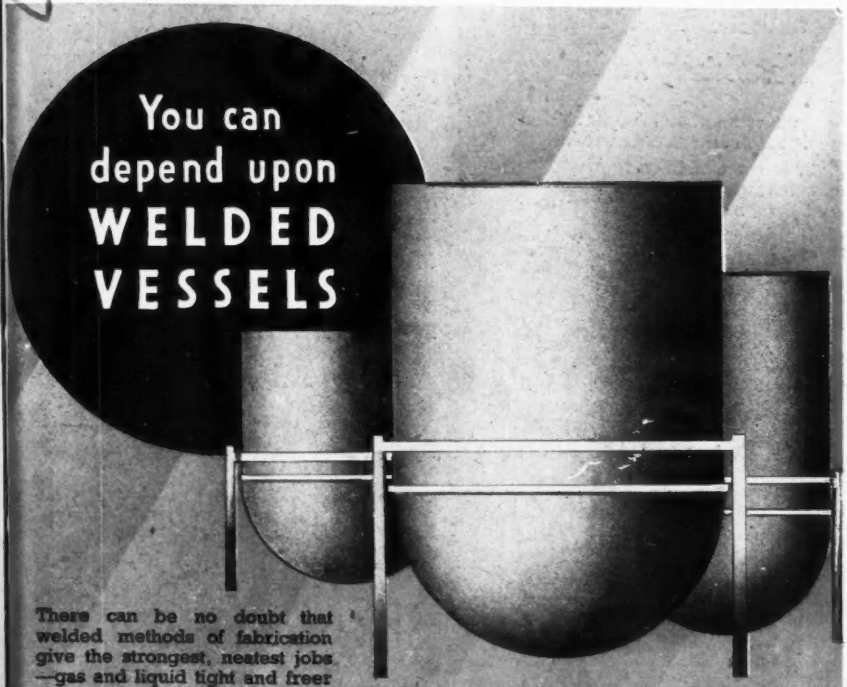

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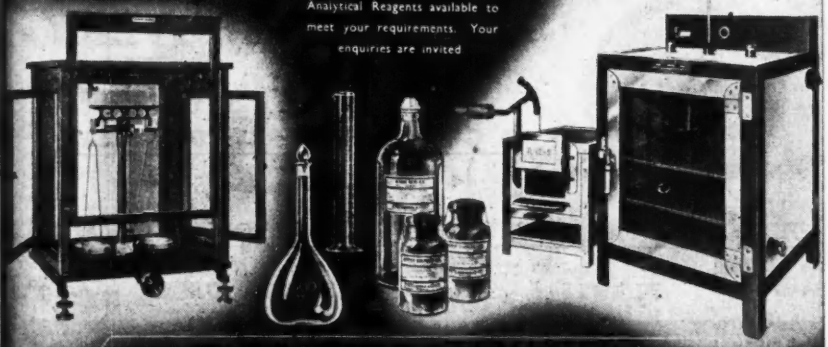

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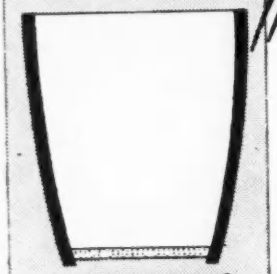

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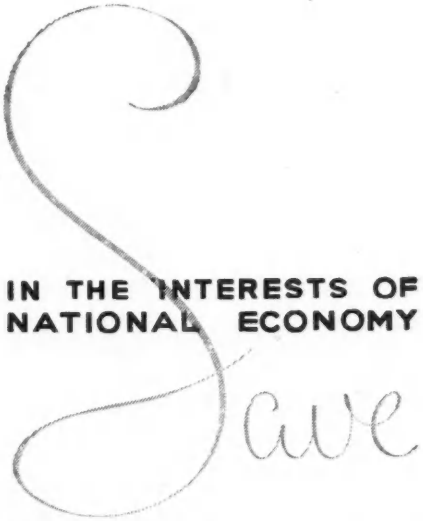

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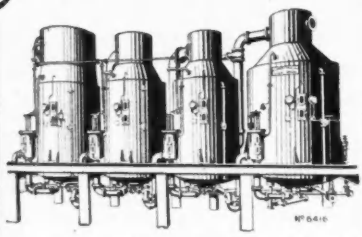

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Aspects of an Industry

MALARIA

MALARIA is one of the greatest scourges that afflict mankind. No part of the world, except a corner of N.W. Europe, is wholly free from its ravages. About a third of the 2,000,000,000 odd inhabitants of the earth have malaria. Every year at least 5,000,000 of them die from it—a total which may be doubled in a year of epidemics. Every year malaria costs the British Empire alone many millions sterling in prevention, cure and pensions. It was once common even in the British Isles. James I and Cromwell probably died of it, and less than a hundred years ago a substantial percentage of the admissions to London hospitals suffered from ague, as it was then called. Its ravages in the tropics can be catastrophic. The old town of Goa in India had once a population of 300,000. Malaria has reduced this number to-day to less than one hundred ! Malaria is caused by a parasite transmitted by certain mosquitoes. These suck blood from an infected human being, and become themselves infected : their bite, in turn, spreads the disease.

There are thus two ways of fighting malaria —by exterminating the mosquitoes or by curing the human being from whom they acquire the infection. Mosquitoes breed in stagnant waters and effective drainage treatment has done much to reduce their numbers. For centuries the most effective cure for malaria was quinine, extracted from a bark which, since it was introduced into Europe from Peru by the Countess of Chinchona, was known as Chinchona bark. Quinine is still a most valuable drug, but it is not without drawbacks, and for many years chemists have been working on synthetic compounds in the hope of discovering a more efficient remedy. Much success has been achieved and two synthetic drugs, Mepacrine and Pamaquin, have been developed for the treatment of malaria. These are now being produced by the British chemical industry. Meanwhile the chemist pursues his search for still more effective drugs, striving together with engineers, entomologists and doctors to bring under control one of the worst diseases in the world.

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MINISTRY OF SUPPLY

Defence (General) Regulations 1939 No. 55. S.R. & O. 1942. No. 1770

AN ORDER

RUBBER MUST NOT BE DESTROYED, THROWN AWAY OR MIXED WITH REFUSE

The Minister of Supply in exercise of the powers conferred on him by Regulation 55 of the Defence (General) Regulations 1939, has made an Order which provides as follows :

1 No person shall, except under the authority of and in accordance with a licence granted or a special or general direction issued by the Minister of Supply,

(a) destroy any waste rubber

(b) throw away or abandon any waste rubber

(c) put any waste rubber in a refuse bin or other receptacle used for domestic or trade refuse, or

(d) cause or permit any waste rubber awaiting or in the course of collection or sale to be or become mixed with any material or article other than waste rubber.

Provided that nothing in this Order shall prohibit or restrict the destruction of any waste rubber if and so far as necessary in the course of any process of manufacture, or for the purpose of saving property from immediate danger of destruction or damage by fire.

2 (1) The holder of any licence granted under this Order shall comply with any conditions contained or incorporated in the licence.

(2) If any licence so granted is revoked by the Minister of Supply, the holder of the licence shall forthwith deliver up the licence to the Minister or as directed by him.

3 IN THIS ORDER : "*rubber*" includes reclaimed rubber, liquid latex, gutta percha and balata, and "*waste rubber*" means any worn-out, disused, discarded or waste material or article of the classes or descriptions specified in the Schedule to this Order, but does not include any material or article which is injurious to health or otherwise offensive.

4 This Order shall come into force on the 7th day of September, 1942, and may be cited as the Salvage of Waste Materials (No. 4) Order 1942.

THE SCHEDULE

(a) *Articles or materials of any of the following descriptions made wholly or partly of rubber* :—
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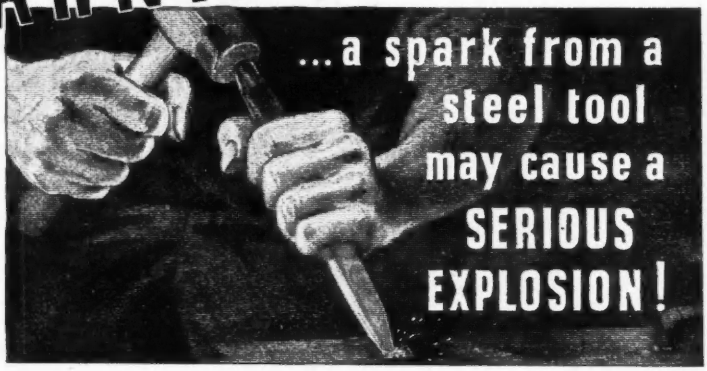

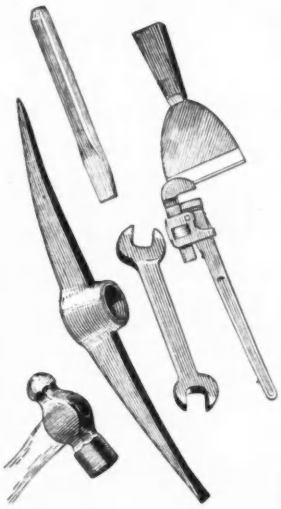

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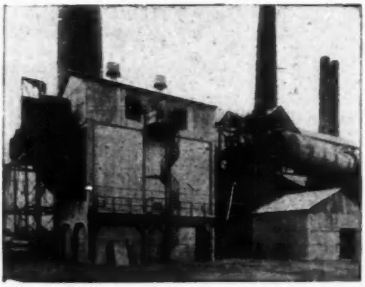

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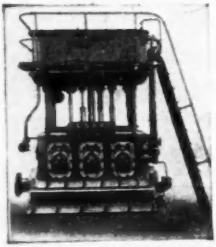

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Coming Problems

THE personnel of industry is rather sharply divided between those who act and think on the purely business side and those engaged in technical production and scientific development. Some few there are who move in both fields. While in no way disputing the importance of technical development and of skilled production, we feel a period is approaching during which the business executive will have the most important task in industry.

Sir Archibald Sinclair has recently denounced the "folly of isolationism" and has pointed out that the problem of producing after the war directly (or indirectly by foreign trade) the goods which will maintain and improve our pre-war standards is far from being solved so far as post-war Britain is concerned. Many people are by now convinced that the decade after the war will be a time of intense international activity in the economic sphere, a period requiring hard work and hard thinking during which a new economic policy must be harrowed out for the whole world if the war is not to leave us like a gasping fish stranded on the seashore.

There are many problems to be solved, some of which are domestic and some international. On the domestic side there will be the aftermath of diversion of industry from its normal manufactures into war production. There will be the problems that have been raised by the concentration of industry into fewer firms. There is a need for strong trade associations to speak for every branch of industry, and there will be a call to define the functions of these associations. Finally, there will be an immense programme of reconstruction which already appears to be so large that the present system of priorities and allocation of raw materials will probably require to be continued. The resettlement of Britain on a peace basis proved difficult enough after the last war. Additional factories and extensions of existing factories had sprung up all over the country, new machinery had been provided, and large numbers of men and women had been trained to industrial production. The same thing has taken place this time, but on an even greater scale. Many of those who were engaged in "white collar" jobs will not want to go back after the freer and more active life of the workshop or the open-air life of the Forces. We shall have many problems to solve.

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tional scale the problems may be even more difficult. The provisions of the Atlantic Charter will no doubt be put into operation and the availability of raw materials for all will alter the scope of manufactures and the particular availability of some raw materials in this country. Nations now at war will require foreign trade if they are to continue to exist and to maintain their standards of living.

All will remember the deplorable economic position of Germany after the last war and the powerful competition of German industry that developed when once the country had been rehabilitated. It is not always realised that the German position after this war will be infinitely worse in some respects than it was after the last war. The Reich Minister of Armament for Munitions, Prof. Albert Speer, has this summer caused a policy to be adopted in Germany which must have profound repercussions on industrial development after the war. He has ordered "the mobilisation of all remaining latent reserves of steel to broaden the basis of steel production required in the German war effort." This order affects not only old iron and scrap, finished parts in iron and steel made in execution of orders since cancelled, and iron and steel spares rendered obsolete by change of types, but even modern machinery and whole industrial plants in so far as they are not adaptable for immediate use in armaments production are to be scrapped without compunction and will be paid for only at the prevailing market prices for scrap. Thus the German Government is destroying immense capital values and is wiping out most of the country's industrial potential in many industries. Two results will follow from this action: first there will be a short period during which new plant is required (and no doubt this plant will be supplied by those who are now Germany's enemies), and during which Germany will be able to compete in foreign markets because there will be no productive capacity from which goods can be supplied. Then, when once German industry has been re-equipped, it will be complete with modern plant of first-class design and embodying all the very latest improvements, whereas this country in particular and most of the rest of the world will still be "making do" with plant which should have been scrapped, but which has not been scrapped. During this period German industry will have its chance to regain world trade domination unless there is such international regulation of trade as will prevent uncontrolled competition. The moral is that we in this country should also occupy the immediate post-war years in rebuilding our factories and industries in such a way as to improve our competitive power.

There is some difference of opinion as to the post-war policy of this country. It is generally accepted that home development is inseparable from overseas development, but Lt.-Col. Pollitt has suggested in a letter to *The Times* that this country can and should be self-sufficient. He points out that British agricultural land if properly utilised will produce all the food the population of this island requires (in itself a surprising statement); that synthetic fibres, artificial wool, and silk can be produced in this country in any quantity; that imported timber can be largely replaced by reinforced concrete and synthetic plastics; that oil can be replaced by anthracite or coke (producer gas) and can be produced by hydrogenation and other processes; and that rubber can now be made synthetically. On this basis Col. Pollitt believes that we could satisfy 90 per cent. of our domestic requirements by home production and he believes that a planned policy of doing this would prevent unemployment after the war.

On the other hand, the Chairman of the B.C.P.M.A., Dr. G. E. Foxwell, also in a letter to *The Times,* has countered this suggestion with the reminder that the introduction of a well-planned programme of national self-sufficiency would cause great distress to many other countries unless it formed part of a system of international planned economy; and that there are many raw materials that must be imported. He reminds us that we are a comparatively small nation in a large world and concludes: "Is it not demanded of us that we shall use our skill and resources in raising the world to our economic level, and thus stimulating consumption, instead of cloistering ourselves in a monastery of our own devising? Chemical engineering, if given a fair chance, can achieve either of these objectives. Should we not strive for the wider one as being (a) of value to all mankind; and (b) of greater ultimate value to ourselves?"

NOTES AND COMMENTS

Research on Alloy Formation

EFFORTS to discover the real reason why an alloy can be stronger than any of its constituent parts are reported from the United States. Hitherto, all explanations have been based on theoretical grounds only, but Mr. W. A. Johnson, a research physicist in the Westinghouse Laboratories, is making experiments with radioactive silver and gold to discover how one metal diffuses into another, and how the atoms of two or more different metals combine to form a homogeneous alloy. The distribution of various metals in ores, and their relative concentration, have already been revealed by the technique of utilising radioactivity, and ores of manganese, arsenic, tungsten, copper, and gold have been examined by this means. Similar methods have been employed by Dr. W. E. Shoupp, in the same laboratories, to determine the distribution of sulphur, manganese, and silicon in steel, following up his discovery of the photographic action of radiations from radioactive phosphorus in steel, already recorded in THE CHEMICAL AGE. A complete analysis by these methods should lead to improved technique in the formation of steel and other types of alloy.

Chemical Treatment of Coke

AT a recent meeting of the London and Counties Coke Association in London, Mr. E. V. Evans, who is President of the Institution of Gas Engineers, raised the question of the possibility of treating coke chemically so that it might more readily be burned in existing appliances as an alternative to the provision of special coke-burning equipment. His suggestion was that by chemical treatment coke would become more active. He followed a speaker—Dr. E. W. Smith—who pressed the urgency of providing more coke both as producer fuel and for domestic purposes. "After the war," he said, "it is going to be necessary to give more attention to coke than has been given in the past." The production of coke is, of course, bound up with the question of the supply of gas and the ever-growing list of by-products which are playing so important a part in the war effort. The needs of the chemical industry will, we feel, have an important bearing on the production of solid fuel after the war.

French Chemists go in Batches

FRESH evidence of Germany's shortage of workers and the means Hitler is adopting to supply this deficiency is constantly finding its way through the European censorship. Following the news we gave last week of the call that Germany has made for French chemists, comes a report that lists of names are now being supplied to Laval who is ordering the unfortunate owners to Germany in batches. Recently, 200 French chemists were dealt with in this way. It is believed that Laval has agreed that not only shall the workers be transferred to Germany, but that the plant of small and medium-sized French firms shall be sent with them to replace worn-out German machinery. There may be another reason for this. Hitler could get the materials and products from France more easily than by moving the machinery which produces them. He evidently feels, however, that their transfer to the east is a good investment in view of the prospects of a second front in the west.

New M.O.W.P. Schedule

A SUPPLEMENT to the Standard Schedule of Prices of the Ministry of Works has been prepared and is now on sale at H.M. Stationery Office (or through any bookseller) price 4d. (post free). This supplement contains prices for approximately 150 additional items which have been found necessary for the type of work for which the Ministry have used the schedule. There is, for instance, a more complete schedule for prefabricated hutments; and schedules for special light-weight steel tubing for camouflage painting, and for asbestos cement pressure pipes; there are also prices for various additional items in most of the trades covered. Contained also in this supplement are corrections of one or two errors in the original schedule. Following certain questions which have been addressed to the committee, the supplement clarifies certain paragraphs and, in a few instances, modifies the rates as originally fixed. For example, the prices in the painting schedule have been recast as a result of the change in bonus on output rates.

Sulphonamide Developments

RECENT development in the use of the sulphonamides has been in the medical province rather than within the scope of industrial chemistry, but these compounds, derived by the skill of research chemists from some of the most ordinary products of the chemical industry, have had so profound an effect on human economy, and one which becomes so much more widely spread every day, that no chemist can fail to be interested in what is going on in this territory. It is only five years, for example, since Sinclair and Barker suggested the use of sulphonamide drugs for local wounds, yet now every American soldier carries into action a packet of sulphanilamide powder which can be shaken, either by himself or by a comrade, into any wound that he may suffer. The British and Russian armies likewise have employed the treatment for wounds with remarkable effect, and the German "M.P." powder and tablets are also made up of sulphonamide compounds. Not unnaturally, a large mass of literature has sprung up around this subject, and a very useful review of this has been published by the *Pharmaceutical Journal* in two recent issues.

Difficulties of Local Application

A UNIVERSAL reduction in the incidence of infection from wounds is reported, and various types of ointment and powder are recommended. Certain difficulties have, of course, been experienced; the large and irregular crystals of the commercially available sulphonamide compounds, for instance, have caused trouble, clinically speaking, and a method of producing microcrystalline powders by sonic vibration or by high-speed mixing machinery has been devised. The size of the resulting crystals can be regulated within wide limits by controlling the speed of admixture and the temperature of the solution. Other observers have examined the rate of absorption of various compounds, and it has been found that sulphanilamide was absorbed more rapidly than sulphathiazole or sulphadiazine, but that the effect of the initial concentration was sustained longer in the case of the last two. The effect of sulphonamides on the actual healing of wounds is still under dispute. Even within the last two years, diverse opinions are to be found, some qualified observers maintaining that any injurious effect in this direction was so slight as to be negligible, others averring that healing was retarded and that sulphonamides should be reserved for obviously contaminated wounds. D. R. Matthews, writing in the *Lancet* earlier this year, has summed up the position as follows: "To be convinced of the usefulness of sulphonamides when applied locally is easy, but to produce irrefutable evidence to prove it is very different."

World-Wide Fuel Economy

SELFISHNESS and carelessness are stigmatised by the chairman of the Fuel Economy Committee, Commander Stephen King-Hall, as the principal enemies in the battle for fuel. Speaking in London this week, he said that the results of the campaign so far were not discouraging, but that the necessary savings would not be made without some degree of discomfort, but a discomfort that would be regarded as luxury by the people of Stalingrad. Meanwhile reports of fuel shortages and the steps taken to meet them are coming in from all parts of the world, whether belligerent or not. In Brazil, for instance, the consumption of fuel oil has been cut by 50 per cent., while a not very encouraging search for local supplies of oil has been going on, mainly in the coastal areas round Bahia and 300 miles to the north in the Province of Alagoas. Power alcohol from sugar is also in use, and a new regulation encourages the substitution of producer-gas for petrol by large users of vehicles. Neutral Argentina reports a sudden acute shortage of fuel, beginning in July last, when queues for petrol and kerosene suddenly made their appearance in the streets. Railway time-tables have been curtailed and some buses have been taken out of service. A Bill, which has passed the Chamber of Deputies and is now before the Senate, provides that all fuel is to be regarded as "of public utility" and liable to be requisitioned by the State; fuel and lubricants for general consumption are to be rationed, and priority quotas will be allocated.

Power in Chemical Works

Transmission Problems Discussed

By H. SEYMOUR

NOTWITHSTANDING the obvious advantages of the individual electric motor drive for many machines used in the chemical industries there are numerous instances where the older shaft, pulley, clutch, and belt or chain are more efficient. In fact, so much has been made of electric drives in general, and the individual motor in particular, that the shaft and pulley method of transmitting power has been pushed rather into the background. Actually, the transmission of power through a suitable shaft properly erected is much more efficient than is generally recognised. One authority claims that shafting, properly aligned and assembled so the forces acting upon it are entirely torsional, will, with plain bearings, transmit power at an efficiency of 80 per cent. or more up to a distance of 6000 ft. If ball bearings are used instead of plain, shafting will transmit power at the same efficiency for 20 times this distance.

Points about Shafting

Shafting has many claims on the chemical engineer's attention. In the first place, it is unlikely that anything will be evolved which will displace shafting altogether. And, secondly, shafting can be made of any metal to resist the peculiar corrosive conditions encountered; in some instances the steel shafting used for power transmission can be plated to resist fumes and moisture. Again, shafting is available in a very wide range of diameters, so that the most suitable can be used, the diameter selected depending upon the horsepower to be transmitted. In larger works the use of a multiplicity of sizes is no very serious objection. Every effort should, however, be made to reduce the number of diameters used, because changes of pulley from one spot to another are often necessary, and such changes involve the use of bushes if the shafts vary in diameter. If a motor is moved from one spot to another it is sometimes necessary to re-erect the shaft and to change its size. In the smaller works, by careful lay-out of machines and proper subdivision of drives, it is often possible to standardise one size of shafting, which makes for simplicity throughout the works.

With a good shaft, trouble is seldom experienced from torsional stresses uncomplicated by other factors. Trouble is much more often encountered as a result of bending stresses due to inadequately supported loads. For this reason it is essential to use good bearings, and plenty of them. The use of too few bearings is false economy, because not only will shaft deflection mean that more power is required to turn the shaft, but there is a virtual certainty of overheating bearings.

The "Stepping-Down" Theory

A few years ago many engineers advocated the policy of stepping down the diameter of shafting from one machine to the next, until it reached its minimum at the last machine on the line. The theory behind this argument is that, while the shaft must be of sufficient diameter at the driving end to transmit the power required to all the machines it drives, at the other end it need only be large enough to transmit power to the one machine. This is sound enough in theory, but it is quite a different matter when put into practice. In the first place, perhaps a dozen different shaft diameters are required on one drive, with the corresponding variations in bearing sizes. In the second place, more trouble is involved in alignment of the entire drive, and the number of spares carried must be increased to correspond with the bearings used. It is a far better plan in such cases to place the motor or other prime mover in the centre of the line so that it transmits the same power to both halves of the drive.

The choice of an actual type of bearing is not so easy, because there are many of them, and to-day they may all be said to be good. Even the plain bearing, too often derided, will, when properly erected and well lubricated, transmit power at an efficiency of over 90 per cent., and it cannot genuinely be claimed that a ball or roller bearing

should be used on the score of efficiency alone. Shafts which are not continually in use should certainly be fitted with plain bearings, while on drives which are frequently started and stopped anti-friction bearings should be used, because their starting friction is much lower than that of plain bearings. The use of ball and roller bearings in such applications also permits of smaller motors because of the low starting friction, which in fact, is little greater than the running friction; with plain bearings this difference is much greater. Where plain bearings can receive regular attention in the matter of inspection and lubrication, they will often prove more economical in spite of their lower efficiency because of their lower first cost. For those who like to work out such things to several points of decimals, it may be said that the interest on the difference in cost of these bearings may not be large enough to cover the difference in loss of power.

The Placing of Bearings

In fitting bearings to the shaft, it is always essential to place them so that the shaft is adequately supported throughout its entire length. It is never wise to economise in the number of bearings, and wherever heavy pulleys, clutches, or couplings are fitted a bearing should be placed as near as possible. It is, in fact, wise to erect one on either side of the shafting fitting if it happens to be unusually heavy. If inspection and lubrication of shaft bearings involves a great deal of trouble or personal risk, then the use of a ball or roller bearing is to be recommended. These anti-friction bearings, once properly installed, require considerably less attention than plain bearings, and on this score alone are often more economical in the long run.

For chemical works it has sometimes been felt that the corrosive fumes would soon affect the very highly polished faces of the balls or rollers in anti-friction bearings. This certainly would be so if these components were not well protected by a coating of lubricant which will " stay put " for very long periods. Unless the conditions are such that strongly corrosive fumes are likely to reach the working parts of the bearing, the ordinary industrial types will prove quite satisfactory. Where the atmosphere is, however, strongly corrosive, it is advisable to instal bearings specially designed for such conditions. It is now possible, for example, to obtain chromium-steel balls running in cadmium-plated races, the race rings being similarly treated to resist corrosion. Ball bearings are also made in some of the non-ferrous anti-corrosive alloys.

Flexible Couplings

It is seldom possible to avoid a certain amount of misalignment in the erection of shafting, and the use of flexible couplings is nearly always advisable, particularly if the drive is a heavy one. Provided that a good flexible coupling is selected and properly installed, a considerable saving in power can be obtained. In any case, the offset between two lengths of shaft should always be kept down to under 1/16 in., and the angle between two lengths should never exceed 5°. In exceptional instances of offset or angularity the situation can be adequately met by using two flexible couplings linked together by a short section of shaft, the outer members of the couplings being connected to the ends of the shafts which must be offset.

Watch the Pulleys

Apart from the question of resistance to corrosive atmospheres the same conditions apply to pulleys in chemical works as to those in other shops. That is to say, it pays to take care in choosing a pulley, and it does not pay to consider first cost only at the expense of cost of installation, belt slip, correct belt tension, undue weight, safety, and reliability. The cheapest pulleys are often not the best, and as much attention should be given to the selection and installation of this apparently simple unit in the power transmission system as to the bearings, couplings, and more expensive accessories. Composition pulleys must not be used if they are to be exposed to moisture, because they are liable to swell, warp, crack, and generally to cause undue trouble. Some fabric pulleys are perfectly suitable for power transmission in chemical works, but the conditions under which they will be expected to work should always be specified. Wooden pulleys are perfectly

satisfactory, provided that the fibres are not tangential; if they are, however, these parts are more liable to slip on the belt and set up uneven wear. Non-metallic pulleys have the advantage, of course, that they do not easily corrode in chemical shops, whereas steel pulleys are always liable to corrode unless they are specially protected.

Clutches are economical where machines or groups of machines are not working continuously, and they may be arranged so as to cut off either a single machine, a group of machines, or a whole shop. A single-line shaft may be used for carrying the clutches or they may be mounted on the main shaft; no definite rule can be laid down, because each installation must be judged entirely on its merits. In any case judicious planning of the machines to be driven assists in keeping the number of clutches to a minimum; though it is false economy to leave a machine running when it is not required, even if this is only for an hour or so during the day. The types of clutch most suitable for chemical works must be determined by the actual conditions, though it will pay to investigate the claims of some of the newer types of clutch, particularly the magnetic clutch, which can be of definite assistance if synchronous motor drives are employed.

Choosing a Belt

Great care must be exercised in the selection of belts. A good oak-tanned waterproof leather belt is very satisfactory for drives where moisture, steam, acids, alkalis, and mineral oils are encountered, though it will generally be unsuitable if the drive is exposed to high temperatures. In such applications a special belt is called for, and this, though naturally more costly, can be relied upon to withstand not only high temperatures, but other adverse conditions such as boiling water, exhaust steam, fumes, and acids. Various special belts have been evolved for particularly arduous conditions, and one works recently installed a plain, stitched canvas belt, sealed with cellulose, for a drive which was exposed to sulphur fumes. As a matter of fact, corrosive liquids do not in the usual way reach a belt, but the surface structure is always liable to absorb corrosive fumes which in the long run amounts to much the same thing. Cotton belts are quite satisfactory in many works, but if the atmosphere is inimical to cotton, then rubber protection must be adopted. Such a belt will, in fact, prove "anti-corrosive" except where it is likely to encounter nitric acid. If rubber protection of cotton fabric is employed the coating should not be heavier than is absolutely necessary, and it is essential to see that the cotton is properly covered at all points—*i.e.*, if mechanical fasteners are employed the cut edges of the belt must be sealed with rubber. In all such instances the belts should not be made endless unless means are provided for taking up the permanent elongation.

Static Electricity

The question of static electricity has proved something of a problem in chemical works, though it is now generally recognised that if the plant is itself a good conductor troubles with static electricity are non-existent. With belting the problem becomes more difficult, though it has been suggested that a copper stitching along both edges of a belt will completely eliminate any danger. In some works the belts are kept moist, while in other plants they are treated with graphite or glycerol. Graphite, being more enduring, is generally better than glycerol, though the belt is not likely to prove dangerous as long as it is kept moist. Dry belts —*i.e.*, non-conductors of electricity— are often a source of danger, and while various special treatments have been developed for obviating trouble due to static electricity, it is essential that the treatment adopted does not decrease the coefficient of friction between the belt and the pulley or in any way affect the life of the belt.

Uncared-for belting can be a source of great waste of power. The first essential is to eliminate slip, as this can be a source of heavy loss, and various special compounds are available for treating belts. Many of these are excellent, giving good adhesion between the belt and the pulley without involving the necessity for extreme tension in the belt. In other cases jockey pulleys can be employed or various special adaptations of the jockey-pulley principle. Another important point is to keep belts clean, as a

certain amount of dirt inevitably accumulates on the belt surface and will become ground in unless it is regularly removed. Oil and grease should be removed immediately from all belts, irrespective of their composition. The method of cleaning a belt depends upon its character, as some types will not withstand boiling water without damage, and care must be taken to replace any protective compound with which the belt is treated and which may be removed during the cleaning process. Regular inspection of all belts must be carried out, not only for cleanliness, but so that any damage can be quickly rectified. This is particularly essential in rubber-covered cotton belting, where a tear in the rubber may expose the cotton to deteriorating action from the surrounding atmosphere. The fastenings should always be carefully inspected, because they are a frequent cause of trouble if they have not been used correctly. Some types of fastening can also be a source of danger, because any metal part working loose is liable to stroke against some object and set up a spark. It is as well, of course, to choose belt fasteners which will not be affected by the fumes they will have to work in, and in any event these must be kept clean and free from dust.

Chain Drives and Gears

The great advantage of the chain drive is its freedom from slip, while the modern chain is practically noiseless. As far as chemical works are concerned, however, there is the disadvantage that the steel chain may be affected by the conditions in the shop—for instance, by fumes and splashes. To a certain extent this can be overcome with totally enclosed chain drives running in an oil bath. More recently, however, developments have taken place in chains of non-corrosive metals, such as stainless steel, bronze, nickel, or Monel metal. Drives of this nature are inevitably more expensive than the usual type of steel chain and are not economical if other methods of protection against corrosion can be employed. Generally speaking, chain drives should not be used where any shocks are encountered, as the belt's elasticity and capacity of slipping are here definite advantages. Chain drives are most suitable where the drives are of constant speed, and where the driving centres are too close for belts and too far apart for gears. Normally chain drives should be arranged horizontally as far as possible, and the tight side of the drive should be on top—the reverse of the belt drive. There are various types of chain drive, and the makers' advice should be sought before installation. The roller type of chain is exceedingly simple and reliable, though open-link chains are more suitable for drives where any clogging from chips, waste, and other matter is likely to occur.

The gear drive is another positive form of drive and is the obvious solution where the driving centres are very close together. Fabric gears have reached a very high degree of efficiency, and are to be recommended where metal gears might be affected by moisture or fumes. Fabric pinions also have the advantage of running quietly.

"T.N.T."

A New Slogan for Industry

MR. OLIVER LYTTELTON, Minister of Production, has given us a new slogan: "T.N.T." He tells us rather naïvely that it means: "To-day, not to-morrow." The implication is clear. He requires the makers of the implements of war to give to their work the well-known qualities of trinitrotoluene one of which, incidentally, is its certainty of response to detonation. There is no doubt that the slogan has behaved correctly in this respect. It has burst on the nation instantaneously with a force that has not been witnessed since Mr. Bevin's "Go to it!" It now remains to be seen what latent explosive power there is in the factories, the workshops, and the mines, and to hope that this touching-off of "T.N.T." will result in an immediate and effectively sympathetic detonation.

LIGNIN AS RESIN SOURCE

Lignin as a source of resin is suggested in a new patent assigned to the Burgess Cellulose Co., Freeport, Ill. Wood, corn-stalk, straw, sawdust, etc., may be used as the source of lignin. Chopped up, the material is cooked in water containing a small amount of calcium carbonate for from 15 to 60 minutes at a temperature of 130°-200° C. This cooking dissolves out the impurities and renders the lignin-cellulose material thermoplastic. After cooking, the mass is washed, dried, and reduced to a powder. When the powder is moulded under heat and pressure, it forms a hard, water-resistant, resin-like product.

The Carnauba Palm

A Fruitful Source of Many Products

FOR decades, carnauba wax has been an article of commerce; but in recent years, with the discovery of new uses and increased demand, exports from Brazil have mounted. Having three times the viscosity of beeswax, and possessing other exceptional qualities, carnauba wax has a wide variety of industrial applications, and in a number of uses is without an equal. No other wax is imported in such quantity into the United States.

The carnauba tree, *Copernicia cerifera*, is a graceful, straight-trunked palm of slow growth. The average height is between 25 and 35 feet, and even after 50 years it seldom reaches a height of more than 40 or 50 feet. Its bark, especially on the lower part of the trunk, is rough, scaly, and thick.

The wide, close-set, fan-shaped leaves grow from yard-long stalks, which issue in all directions from the crown of the tree. Carnauba flowers are small and numerous; and the fruits, ovaloid and about an inch long, grow in bunches, which are greenish when young. When ripe, they turn rust-colour and drop to the ground. The wax is exuded from the pores of the leaves and leaf-stalk, or petiole. It covers the leaves in the dry season and prevents the excessive evaporation of water that soon reduces surrounding vegetation to a dingy grey. From July to December in north-east Brazil, during the period of inexorable sunshine, little else besides the thick-leaved, widespreading oiticica and the slender, fan-topped carnauba remains green. In drought years when rain fails even in the normal rainy season, the amount of wax increases materially for a time. If the drought is too prolonged, the tree is likely to tire and may even die after two or three years.

Production Varies with Climate

It is generally accepted that there are two species of this palm, only one of which produces wax. The one yielding no wax, *Copernicia caranda*, grows in the States of Amazonas and Matto Grosso, as well as in Bolivia, Paraguay, and Argentina. Even *Copernicia cerifera*, the wax bearer, however, does not yield appreciable quantities of wax outside the semi-arid north-east portion of Brazil. The tree has been transplanted to Ceylon and French Equatorial Africa, but, although it has flourished there for many years, it has not produced any recoverable wax. Geographic distribution of the carnauba is extensive throughout Brazil, but similar weather conditions usually prevail in the chief producing areas. As a result, production may show considerable variation from year to year, declining, for example, when rains are heavy during the normally dry season.

In its native country the wax represents only a fraction of the palm's usefulness. Timber from this tree is used for beams, walls, floors, pillars, and roofing; it makes durable furniture, and takes a fine polish. Particularly resistant to salt water and to insects, it makes excellent pilings, and is used for fences and bridges. The wood from the lower part of the trunk is too hard to be burned in the home, but, since it burns with an intense heat in a hearth, it makes a first-class industrial fuel. For home fires the bark is good.

Uses of Fibre and Sap

The inferior leaves may be used for thatch roofs, also for making ropes, coarse hats, mats, sacks, and other coarse-woven material. By carding, a suitable mattress stuffing is obtained. The better-grade leaves are used for hampers, baskets, and finer hats. The making of hats from carnauba fibres, as a matter of fact, is an important industry in Ceará, and the hats, similar to panamas, are shipped to all parts of Brazil. By spinning the long silky and resistant fibres, fine ropes and nets can be made.

From the sap, a tapioca and a fermented beverage can be produced. Often the young shoots are used as a green vegetable. In times of scarcity, a starch, resembling manioc, may be made from the hearts of young carnauba plants. The dried fruit may be crushed to produce a cooking oil; and from the roasted and ground fruit, a coffee-like drink may be brewed. A preparation, said to be similar to sarsaparilla, can be extracted from the roots and is used medicinally. When other fodder is not available, the stalks, young saplings, and residue may be fed to cattle. Use of the carnauba-wax candle was formerly widespread in Brazil, but it has been largely displaced outside the carnauba area.

Among the industrial uses of carnauba wax, most familiar is its use as a base for shoe, floor, and furniture polishes and waxes. In various compositions, it may be used for electric insulators, gramophone records, waterproofing wrapping paper, cardboard, and textiles, and to manufacture soap and sound-film. It is employed in manufacturing lubricating oils. Carbon paper when coated with it yields cleaner copies. It has pharmaceutical value in certain salves and ointments, and is the chief ingredient in the sealing material of dry-cell batteries. In the last war it was employed in the manufacture of picric acid. A recent development is its use in paint to give a waxy surface on which dust does not easily cling.

Superpolyamides

New Experience in Germany

PRODUCTION of the superpolyamides that are marketed under the trade name of Igamid in Germany seems to have made some progress, as the producers, I. G. Farbenindustrie, have on various occasions drawn the attention of potential users to the new materials. It is claimed that they can be used for general purposes in electrical engineering where they prove satisfactory if the Igamid type with the lowest moisture content is chosen. Chemically their resistance to organic solvents, oils, and fuels is mentioned as a special advantage, but users are warned against employment of superpolyamides where they come into contact with acids. In boiling water they absorb a large amount of moisture and become soft, but they retain their shape and, after drying, regain the same hardness and dimensions as before. Users who tried Igamids for die-casting found that difficulties were caused by the comparatively high softening temperature. To overcome these drawbacks, certain alterations in casting apparatus have been worked out by the makers, and larger cylinders and a special cap for the nozzle (the latter designed to prevent the thin polyamides from trickling through after the piston has been withdrawn) are now offered. It is stated that superpolyamides used for die-casting must be thoroughly dried; otherwise they will turn brownish when air is admitted.

Butadiene from Butylene

Eleven Catalysts Tested

BUTADIENE (divinyl) is the most important raw material for synthesis of rubber-like polymers. It can be obtained, for instance, by dehydrogenation of α-butylene which is present in the cracking oil, or can be produced from butane or synthesised from ethylene. An investigation of the conversion of butylene into divinyl has recently been reported by Balandin, Zelinski, and others, in *J. Appl. Chem. Russ.*, 1941, *14*, 435.

Butylene has to be diluted with nitrogen or carbon dioxide. The latter is preferable since with butylene it forms carbon monoxide and hydrogen in a reaction $2\ C_4H_8 + CO_2 = 2\ C_4H_6 + H_2 + CO + H_2O$, and the nearly equivalent mixture of CO and H_2 can be used for syntheses of fuel or solvents. The dilution must be at least 6 CO_2 for one molecule of butylene; in all the later experiments the dilution 7 to 8 was adhered to. Eleven catalysts have been tested. Magnesium oxide, two mixtures of vanadium pentoxide with aluminium oxide, and silver vanadate caused almost no formation of butadiene. Chromic oxide was more active. Kieselguhr, zircon, copper, zinc, and molybdenum did not increase its activity, but a special method of preparing it resulted in a powerful catalyst which was used to determine the most favourable conditions of dehydrogenation. This method is not disclosed. The time of contact between the gas mixture and the catalyst was varied from 0.2 to 0.9 sec. at 600° C. and the highest yield observed for 0.3-0.4 sec. The yield was 31-34 mol. of divinyl per 100 mol. of butylene passed through, or 74-80 mol. of divinyl per 100 mol. of butylene used up. An even higher yield, when referred to the butylene consumed, was reached at 550° C. but the consumption of butylene took place too slowly. At 650° C. butylene was consumed rapidly but too much ethylene was produced, so that temperatures of 600° C., or a few degrees lower, gave the best results. The "special chromic oxide" is relatively stable. Its efficiency increases during the first hour of its utilisation but then diminishes again, and a regeneration is required every two hours. This is carried out by blowing air through the catalyst for 10-15 min. at 575°-600° C.; catalysts which had been regenerated more than 10 times showed no signs of deterioration.

Indium Alloys

Difficulty of Determining Tin

AVAILABLE methods for indium alloy analysis have been investigated by C. W. Hopkins, of the Carnegie Institute of Technology (*Ind. Eng. Chem. Anal. Ed.*, 1942, *14*, 8, 638), and the most accurate and efficient chosen by means of analytical tests. The investigation is part of a research programme sponsored by the Bristol-Myers Co., New York, and the Sun Tube Co., Hillside, New Jersey. For rapid determinations of indium, the potentiometric titration of Bray and Kirschman (*J. Am. Chem. Soc.*, 1927, *49*, 2739) with potassium ferrocyanide was used. Satisfactory procedures for indium-lead, indium-zinc, and indium-aluminium were determined, an accuracy of 0.1 to 0.2 per cent. being attainable, but no precise method for indium-tin alloys could be found which permitted a determination of greater than 1 per cent. accuracy.

In attempting to locate a suitable means of separation of indium and tin for accurate quantitative analyses, many types of separation were studied and tested. The volumetric determination of tin with iodine in the presence of indium gave poor results, as did the determination of indium potentiometrically with potassium after distillation of stannic chloride from indium solution. The precipitation of indium by means of 8-hydroxyquinoline and also by 8-oxychinolate likewise proved unsatisfactory.

Bearings in Kiln Construction

Australia Meets the Problem

THE use of various types of bearing for power transmission in chemical works is discussed at some length in the principal article in this issue. How the need for studying the possibilities of alternative types of bearing may be forced upon us as a necessity any day is brought out by an article in a recent issue of the *Industrial Australian and Mining Standard*.

In the assembly of fan shafting in kiln construction, the writer points out, ball bearings have, in the past, generally been accepted as essential, particularly in the case of longitudinal shaft kilns where the large majority of bearings used are mounted inside the kiln, and exposed to the high temperatures and humidities of the kiln atmosphere. However, the defence forces' ever increasing demand for ball bearings, and the fact that all ball bearings used in Australia have to be imported, resulted in the setting up of governmental control measures under the Directorate of Machine Tools and Gauges, to determine and control priorities in so far as bearings are concerned. In the list of priorities subsequently issued, the use of ball bearings in the construction of timber-seasoning kilns was not included, so that ball bearings may not now be purchased for use as kiln fan-shaft mountings.

As a result of this decision, where bearings are required for new kiln construction or for replacement purposes in kilns, some type of bearing other than ball bearings must be sought, and until experience either confirms or confutes the opinion, it seems that a good quality brass bearing of the self-aligning type and fitted with sight (or drop) feed oil lubricators, is probably the most satisfactory substitute. The lubricators should, of course, be of sufficient size (say the half-pint size) to give an ample reservoir of oil.

Design for Supervision

It is generally well known that metal bearings need to be under fairly constant supervision, and so located that they can be frequently inspected. Where, therefore, the kiln design is such that bearings must necessarily be located in positions difficult of access, or directly exposed to high kiln temperatures or humidities, it is obvious that this requisite cannot be complied with should metal bearings be used in such cases. Under such conditions, only one bearing has to fail and, more likely than not, all other bearings associated with it will likewise fail before the trouble is noticed, or can be rectified. Furthermore, even if the bearing does not actually fail, there is some risk of fire should a bearing start to run hot and not be discovered in time. Obviously, then, a kiln design requiring the mounting of a metal bearing inside the kiln interior is not to be recommended and, at least while ball bearings are unobtainable, this type (such as the longitudinal shaft) should be completely avoided.

With the cross-shaft type of kiln, all bearings are mounted externally, are unexposed to kiln conditions, and are in easily accessible positions—all conditions which comply with requirements for the safe running of metal bearings. It is strongly recommended, therefore, that only the cross-shaft type of kiln be erected in further construction.

Ireland's Mineral Wealth

Pyrites and Ochre in Eire

CONSEQUENT upon the opening of the barytes deposits on Benbulben in County Sligo, there has been a revival of interest in Eire's mineral deposits. Both pyrites and ochre are now being produced in County Wicklow. Production of sulphur-bearing ore from the old mines in the Vale of Avoca, derelict for about 20 years, has been going on for some months under the Irish Mineral Development Company and is expected to average 100 to 150 tons per week during the coming winter. The output is to be used in conjunction with phosphates from the County Clare deposits for production of artificial fertilisers. Mr. L. C. Wynne is the advising engineer to the company, with Mr. W. B. English and Mr. Murrough O'Brien as his chief assistants. At present only ores with a sulphur content of 35 per cent. and over can be dealt with, but efforts are being made to obtain additional machinery to enable ore of lower sulphur content to be worked. Another development under consideration is the securing of the copper, lead, iron and zinc concentrates contained in the ore for use by firms seeking these metals in their pure state. Further along the Vale the ochre deposits are being worked. Crude ochre has been shipped to England for some time, but two Dublin men —Dr. Hugh MacNicholl and Mr. John MacNicholl—are engaged in producing ochre in its pure state and hope shortly to reach an output of five tons per day.

Until the second half of the last century Ireland's mineral deposits were worked successfully, but Continental competition, combined with the difficulty of access of the deposits, led to the abandonment of many once-prosperous workings.

Oil and Colour Chemists

London Section Meeting

IN his address to the London Section of the Oil & Colour Chemists' Association, on Saturday last, Dr. H. W. Keenan (Chairman of the Section) discussed the collective and individual responsibilities of scientific associations, and inquired as to whether scientists had duties beyond the purely scientific. The first responsibility of all scientific associations, he said, was to concern themselves with science and to encourage the publication and reading of scientific papers of the highest order. Equally, they had other responsibilities of an individual character concerning the welfare of their members, the status of scientists in industry, the equality of opportunities for their advancement, the organisation of technical education, the co-ordination of research, and a proper view of the social functions of science.

Modern society, he continued, was not instructed in the value of science, and it was manifestly a part of the collective responsibility of scientific associations to devote some time and energy to a form of education mercifully free from the taint of aggrandisement, nationalism, patriotism or any subversive "ism." The strength which scientists sought was the strength to share in the control of industry—to make of scientists a "body corporate" which would play its part with others in a wise modification of our social and industrial system, as the stress of war had shown to be necessary.

Education in Science

Technical education was already recognised as one of the individual responsibilities of the Association, and some interim scheme could no doubt be put into immediate operation for the benefit of youths now attaining the age of sixteen years, for, with all the warlike distractions around them, they had probably lost the inclination for any further form of education. The post-graduate lectures of the London Section of the O. & C. C. A. had the flavour of an educational policy, in that they were a modest attempt to explore the value of liaison with our universities and technical colleges. An extension of these to all scientific industrial associations might be expected to lead to a desirable type of affiliation with our universities such as had never been known in this country; with the result that our industries would eventually become as fundamentally sound in science as our universities would be broadened in their practical outlook. The activities of science in the universities and in industry were of necessity organised into many groups. There was a tendency for those groups to become self-contained, which in the case of research was especially wasteful and conducive to overlapping. It should be the collective responsibility of scientific associations to take steps to avoid any kind of mutual isolation. He proposed that all honorary secretaries of these associations should form a committee to meet with the object of exchanging information concerning their activities. Such a committee could operate in all matters calculated to further the common interests of science and industry.

Scientists and Company Law

Among the things that required reconstructing were some of the commercial and company laws which were at the root of many of the unsavoury features of modern industry. A scientist was as likely to put his finger on the good and bad points of law as any other intelligent person who had spent his life in an executive capacity, and the scientist should have just as much say in the matter as the business man, since his future was to be equally affected. If the spirit of healthy competition was to be preserved, the scientist *must* be there, for such competition would turn wholly on the intrinsic merit of products and not on any insignificant gymnastics with their market value. Scientists must play their rightful part in reconstruction, not as a collection of ostriches, but as a vigorous unified and co-ordinated body.

An animated discussion followed. Those taking part were, Mr. David C. Roe, the honorary secretary of the Section; Messrs. W. Garvie, G. Copping, J. L. Pinder, Neil R. Fisk, Dr. R. F. Bowles, Messrs. Hislop N. Slee, H. A. Idle, A. Nutton, and D. W. Bomford. Mr. A. J. Gibson, a past-president of the Association, proposed a vote of thanks to Dr. Keenan, which was seconded by Mr. W. H. Screeton.

SELF-STERILISING FABRIC

By incorporating into fabric fibres the antiseptic tetramethyl thiuram monosulphide, or the corresponding disulphide, together with a waterproofing agent such as pyroxylin, oxidised oil, and synthetic resins, according to U.S.P. 2,282,181, issued to R. Guinzburg, it is claimed that, when wetted, the fabric immediately becomes sterile, killing any bacteria which might be present. This is possible because the antiseptic agent in the fabric can be leached from the fabric through the waterproofing agent. In this way an active antiseptic is always present on the surface of the fabric material.

Producer Gas Progress

Mobile Producers' Plan Discussed

THE Mobile Producer Gas Association, which last week sent a deputation to the Minister of War Transport, is holding a special meeting this week to consider and report on the position, and is to issue a statement afterwards. Though some progress has been made in the equipment of public service vehicles with producer gas plants, implementation of the Government plan lags so far as goods vehicles are concerned. The Government plan, which was announced in April last, was for the compulsory equipment of 10,000 commercial vehicles with the apparatus known as the Government emergency producer, "as soon as practicable." Equipment of a larger number of vehicles was precluded, declared Lord Leathers at a later date, by the shortage of anthracite suitable for the purpose.

Filter Processes

In July it was officially announced that two types of Government apparatus had been developed. Orders had been placed for 2500—later for 5000—of the water-filter type, the type most suitable for vehicles subject to regular maintenance, such as public service units. It was at the same time stated that the final design for the second, or dry-filter, type had been completed and that an order for 5000 was being placed immediately.

Recently the Mobile Producer Gas Association, representing the independent manufacturers, submitted a plan to the Ministry of War Transport whereby through the use of standardisation methods some 10,000 vehicles could be converted to producer gas within nine months. No official statement on the fate of this plan has yet been made.

Personal Notes

MR. BRINLEY MORGAN, of Ystalyfera, Glamorgan, has been awarded an Exhibition from the Miners' Welfare National Scholarship Fund, tenable at the University College of Swansea, for an honours degree in metallurgy.

MR. J. R. FELTON succeeds MR. F. H. WYNNE as Chief Inspector of Mines under the Ministry of Fuel and Power, Mr. Wynne having reached the age for retirement on September 20. Mr. Felton has been Deputy Chief Inspector since the end of 1937.

MR. GEORGE BRIGGS has been appointed deputy controller in charge of iron and steel supplies, Ministry of Supply. Mr. Briggs, who succeeds Sir John Duncanson, was before the war a special director of the English Steel Corporation, Ltd., and a director of Darlington Forge, Ltd.

DR. C. WEIZMANN, who was formerly Professor of Chemistry at Manchester University, and is better known as President of the Zionist Organisation, is reported to be working in the United States on a new synthetic rubber process. Many of Dr. Weizmann's inventions were used during the last war.

MR. JOHN SWAINSON TOWERS, managing director of J. W. Towers and Co., Ltd., Widnes, and only son of the late Mr. J. W. Towers, and Mrs. Towers, of Helsby, Cheshire, was married on September 19 at St. Michael's, Blundellsands, to Beatrice Hope (Betty), W.A.A.F., younger daughter of Mr. and Mrs. Whinnerah, of Blundellsands, Lancs.

The Lord President of the Council has appointed SIR LAWRENCE BRAGG, O.B.E., M.C., D.Sc., F.R.S., PROFESSOR J. E. LENNARD-JONES, Ph.D., D.Sc., F.R.S., DR. A. MCCANCE, D.Sc., and SIR RAYMOND STREAT, C.B.E., to be members of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research from October 1, 1942. DR. G. M. B. DOBSON and MR. S. K. THORNLEY will retire from the Council on completion of their terms of office on September 30.

MR. EDWARD T. STERNE, general manager of Sternson Laboratories, Brantford, Ontario, has been appointed Chemicals Controller for Canada, in succession to Mr. J. D. Lorimer. Mr. Sterne has for over two years been connected with the explosives and chemicals production branch of the Department of Munitions and Supply. In the last war he was chief chemist of the Trenton, Ontario, explosives plant, and later went to England as foreign technical representative of the Shawinigan Company.

New Control Orders

Limitation of Supplies

An amending Order to the Limitation of Supplies (Miscellaneous) (No. 16) Order (S. R. & O. 1942, No. 1510) has now been issued. It effects two important changes, *viz.*: (1) controlled goods used in the production of uncontrolled goods are again subject to quota restrictions as in the previous Miscellaneous Orders; and (2) small manufacturers, whose quotas now fall below the £100 a month limit allowed to unregistered manufacturers, may increase their supplies without incurring any liability to prosecution, provided that all their supplies to *all* persons are not more than £100 a month.

Any small manufacturers who decide to supply in excess of quota but to keep their total supplies within the £100 a month limit, must send before February 7, 1943, written notification that they have done so to the Board of Trade, I. & M. 4 Depart-

ment, Millbank, London, S.W.1. Inquiries about the Order should also be sent to this address. The new Order is entitled the Limitation of Supplies (Miscellaneous) (No. 17) Order (S. R. & O. 1942, No. 1842).

Tins, Cans, Kegs, etc.

The Control of Tins, Cans, Kegs, Drums, and Packaging Pails (No. 8) Order, 1942 (S. R. & O. 1942, No. 1870, price 1d.), which came into force on September 25, has been made by the Minister of Supply, for the purpose of imposing further restrictions on the use of controlled material for containers. The Nos. 5—7 Orders are amended by the introduction of restrictions on containers made of tinplate, tinned sheet, terneplate, terne sheet, lead-coated sheet, and galvanised sheet.

Scrap Metal

Under an order entitled the Particulars of Scrap Metal (No. 2) Order, 1942 (S. R. & O. 1942, No. 1723), the No. 1 Order, which was quoted in THE CHEMICAL AGE, on May 23 (p. 266), is extended to cover the whole of Great Britain. By this order every occupier of premises in the country is required to make a return to the Minister of Works and Planning, on a form obtainable from "Scrap Recovery," Ministry of Works and Planning, Sanctuary Buildings, Great Smith Street, S.W.1, of any scrap metal of more than 3 tons in aggregate on the premises which they occupy. If a return has already been made from the areas specified in the No. 1 Order, a further return need not be made. The Order came into force on September 21, and the return must be made within 30 days of that date.

Fertilisers for Scotland

The Control of Fertilisers (No. 26) Order, 1942 (S.R. & O. 1942, No. 1850), prohibits the delivery of any fertiliser in Scotland at a date more than 60 days after the agreement to dispose of the same, except under special licence from the Minister of Supply or for the purpose of fulfilling a potash allotment note. The delivery of imported potassium salts to Scotland in packages of more than 56 lb. is also restricted. The Order came into force on September 21; an appendix prescribes forms for the "imported potash fertiliser request" and the "potash allotment note."

General News——From Week to Week

Several esters of cellulose have been proposed as alternatives to cellulose acetate and cellulose nitrate (the basic cellulose ester for celluloid). Ethyl cellulose and cellulose aceto-butyrate are reported to be finding favour in the plastics industry.

Three Government-sponsored factories for dehydrating vegetables are to be set up in England. One will dry cabbages, another will produce a soup powder from dehydrated carrots, potatoes, and steak. It has not yet been decided what the third will specialise in.

No shortage of magnesium for fertilisers is in prospect in America, according to the U.S. Department of Agriculture. The place of imported magnesium salts is being taken by various forms of magnesium oxide, one of which is obtained by heating dolomite so as to change its magnesium content to a more soluble form.

The executive committee of the Chemical Workers' Union is to send to the Minister of Labour a series of complaints with regard to the transfer of workpeople under the Ministry's direction. An official of the union said last Tuesday that the executive committee knew of many cases of the transference of highly-paid men to factories where they were doing unskilled work at lower rates of pay. Another complaint was that in their new jobs men were engaged on risky, technical work of which they had no previous experience.

With the object of directing the preparation of codes setting out how all materials can best be applied to the task in hand, the Minister of Works and Planning has now completed arrangements for a committee to co-ordinate technical practice in the different branches of civil engineering, public works, and building. It is called the Codes of Practice Committee.

The Waste Paper Recovery Association is sponsoring a three-day exhibition entitled "Design for Economy—Paper in Battledress," which will be held in the ballroom of the Savoy Hotel (Embankment Entrance), on October 13, 14 and 15, from 10 until 5. There will be some 50 displays showing what has been done by representative undertakings in effecting economies in the use of paper and board.

Companies engaged in selling raw mica are asked by the Ministry of Supply to send to the Director for Sundry Materials, Ministry of Supply, Melbourne House, Aldwych, W.C.2, a statement of the sterling total of the sales of raw mica in its imported form (block or splittings) which they made in the year 1941 *directly* to processors and/or users in the U.K. This step is taken in connection with the arrangements to be made for the distribution of raw mica, of which the Ministry will be the sole importer.

Nearly 350 new names are included in the Trading with the Enemy (Specified Persons) (Amendment) (No. 15) Order, 1942 (S.R. & O. 1942, No. 1840), which came into force on September 19. Deletions, numbering 55, include the Chemische Fabrik Rohner, A.G., Pratteln, Switzerland.

During the current week copies of a revised issue of Customs and Excise notices, Nos. 77A (an amendment of No. 77), 78 (Liability), and 79A (Valuation and Maximum Prices), are being posted to all traders registered for the purchase tax. Copies of No. 78C (Office Machinery, Stationery, etc.) will be posted to registered traders who appear to be concerned.

Foreign News

Imports of chemicals into Australia in 1941 amounted in value to £5,776,568, compared with £6,643,072 in 1940. The chief items were dyes, fertilisers, and drugs.

The National Refining Company is to build and operate in Coffeyville, Kansas, U.S.A., a crude oil refinery estimated to cost over $6,000,000 with equipment, which will be financed by the Defence Plant Corporation.

Treatment of beach sand at Byron Bay, New South Wales, for the recovery of zircon and rutile-ilmenite concentrate has been held up for three months recently owing to lack of water, according to the report of the directors of Zircon Rutile, Ltd.

Preliminary prospecting and testing work on asbestos deposits at Asbestos Point, near Strahan, Tasmania, covering an area of 300 acres has been carried out by Minerals (Vic.) Pty. Ltd. Samples of the fibre are stated to be satisfactory and further tests of the deposits will be carried out at depth.

The War Production Board of the U.S.A. has established an organisation for the purchase and sale to war contractors of idle, frozen and excess stocks of iron and steel. It will function in much the same manner as the Copper Recovery Corporation, which is now in the process of directing millions of pounds of copper into war use.

An agreement has been signed by the Uruguayan authorities with the Export-Import Bank of Washington, whereby the latter will grant a credit of £3,000,000 to Uruguay to enable the Rio Negro Hydro-Electric Scheme to provide the current for various industries, including new chemical plants.

A new lignite distillation plant is to be built in France by the Société Chimique de la Grande Paroisse at St. Hilaire-sur-Allier under an agreement with the Vichy Ministry of Industrial Production. The company will use its own patents and has announced its intention of extending the plant for the treatment of mineral oils.

The Soviet Academy of Sciences, it is announced from Moscow, has set up a special committee, under the chairmanship of M. Krylov, the mathematician who translated Sir Isaac Newton's works into Russian, to celebrate the tercentenary of Newton in December.

Purchasers of "lumiline" lamps from the U.S. General Electric Company's lamp department at Nela Park, Cleveland, have to return an equal quantity of old ones, as these lamps, of which some 2,000,000 are in circulation, contain considerable amounts of nickel and ferro-chrome.

The production of tar oil from peat makes progress in Denmark, and many small plants are engaged in its manufacture. Recently, a Danish firm started a big plant in Aalborg at a cost of 700,000 Kr., and it is hoped that the Danish peat coke supply will reach 10,000 tons yearly by the end of this year.

A new company, the Società Mineraria Rosolina, has been formed in Italy for the development of the natural methane sources at Rosolino d'Adda, the daily capacity of which is 8500 cu. m. It is a subsidiary of "Italgas," the large company that supplies gas to many of the principal Italian cities.

The Central Government of India has granted permission for dealing to take place with the enemy firm of Fritz and Oswald Metzl (known as "Chemos," chemical manufacturing and trading company), of Bombay. Trading activities of the firm must be confined to India.

Aluminium silicate is to be mined by Steaua Romana, one of the leading oil producers in Rumania. S.R.P. has obtained a licence for exploring bismuth, lead, and zinc deposits. Intreprinderile Cero-Chimice-Farmaceutice is to investigate asbestos deposits, while asbestos and kaolin deposits are to be examined by Breaza-Zlatna S.A.R.

Spent tanbark or wood chips from which the tannin has been extracted are being used by the American Oak Leather Co. for the manufacture of plastics. The wood can be converted into a good, fast-burning, nitrated cellulose simply by treating it with a half-and-half mixture of sulphuric and nitric acids, and afterwards giving it a thorough washing.

A short and economical process for making butylene glycol has been announced by the U.S. Department of Agriculture, involving the fermentation of crops, such as corn and wheat. The department's chemists are studying butylene glycol as a possible link in production of butadiene for synthetic rubber, the major problem being its conversion to butadiene on a commercial scale. Excellent yields of pure butadiene from agricultural butylene glycol have been made in the laboratory, but the process is not as yet developed to a pilot-plant scale.

For commercial negotiations with Hungary the central industrial organisation in Germany has formed a special chemical commission whose object it will be to prepare schemes for co-operation between the chemical industries of the two countries. A corresponding committee has been formed on the Hungarian side.

A new subsidiary of I.G. Farbenindustrie, Gesellschaft für Synthese-Produkte m.b.H., Frankfurt, has been formed to acquire, construct, and operate plant for the treatment of high-molecular paraffins. The new enterprise has been authorised to establish branch offices in and outside Germany and to take over existing plants in part or full.

Svenska Formalin A/B, a company with a capital of 400,000 kronor formed early this year, is building a formaldehyde factory at Sickla, in Northern Sweden, with a capacity of 1500 tons per annum. Methanol is obtained from a plant at Lycksele. The production will be used for making synthetic glues and resins.

A new £250,000 Mineral Industries building is to be opened in October by the University of West Virginia. It will contain, amongst others, a department of chemical, metallurgical, and ceramic engineering, provided with three special research laboratories, and several others, including one of two stories, designed for chemical engineering unit operations.

Imports of metals and minerals (including coal) into Sweden during the period January-April, 1942, were valued at 93,100,000 kronor, compared with 116,500,000 kr. in the comparable period last year. Exports during the first four months of 1942 in the minerals and metals group (comprising almost exclusively iron ore) amounted to only 105,300,000 kr., as against 146,000,000 kr. in the 1941 period.

The Juganil Company, a new firm in Serbia which sells caniline dyestuffs and chemical products, is among the recent interests of I.G Farbenindustrie. The German chemical trust also controls the Titanit Co., an industrial chemical concern at Mahicno, near Karlovac in Croatia, which was to be liquidated, but will instead reduce its capital from 8 to 4 mill.Kn, and change its name to the Company for Explosives and Chemical Products.

Forthcoming Events

The **Association of Scientific Workers** is holding a conference at the Co-operative Hall, Downing Street, Manchester, on **September 27.** At the morning session, at 10.30 a.m., Professor H. Levy will speak on "The Place of Science in the National Effort"; in the afternoon at 2.30 there will be a discussion on "Science and Production in the North-West."

The opening meeting of the **Electrodepositors' Technical Society** will take place at the Northampton Polytechnic, St. John Street, E.C.1, on **September 28,** at 6 p.m., when the following paper will be presented: "Electro-Chemical Methods for Rust-Proofing," by H. Silman, B.Sc.

A meeting of the **Society of Chemical Industry,** Yorkshire Section, will be held in the Chemistry Lecture Theatre, Leeds University, on **September 28,** at 6 p.m., when Dr. E. C. W. Smith, B.Sc., Ph.D., will discuss the chemical and physical properties of incendiary materials which have been used in enemy air attacks.

A paper, entitled "Whither Plastics?" will be presented, in Glasgow, by Mr. Cecil Chapman, to a joint meeting of the local sections of the **Institute of Chemistry,** the **Chemical Society,** and the **Society of Chemical Industry,** on **October 2,** at 7 p.m., in the Royal Technical College.

The London Section of the **Society of Chemical Industry** will open the session with a meeting in the Rooms of the Chemical Society, Burlington House, W.1, at 2.30 p.m., on **October 5,** when the chairman (Dr. A. J. V. Underwood) will deliver his address, entitled "Catalysts: Ancient and Modern."

A meeting of the **Electrodepositors' Technical Society** will take place at the James Watt Memorial Institute, Great Charles Street, Birmingham, 3, on **October 6,** at 6 p.m., when the following paper will be presented: "Recent Developments in Metal Rectifiers as Applied to Electrodeposition," by Mr. D. Ashby, B.Sc., A.M.I.E.E., A.M.I.Mech.E.

The **Chemical Society** (Leeds Area Section) will hold a meeting in the Chemistry Lecture Theatre, Leeds University, on **October 12,** at 6.30 p.m., to hear Dr. F. Fairbrother speak on "Radioactive Isotopic Indicators."

The opening meeting of the 1942-43 Session of the **Chemical Engineering Group** (Society of Chemical Industry) and the **Institution of Chemical Engineers** will be held jointly on **October 13, at** 2.30 p.m., in the rooms of the Geological Society, Burlington House, London, W.1, when a paper on "The Production of Radium" will be presented by E. F. Mactaggart, B.Sc., A.R.C.S., A.M.I. Chem.E.

The opening meeting this session of the **Institute of Fuel** will be held on **October 13,** at 2.30 p.m., in the Lecture Theatre of the Institution of Electrical Engineers, Victoria Embankment, London, W.C.2, when the president, Mr. W. M. Selvey, will present a short address. This will be followed by the presentation of the Melchett Medal for 1942 to Dr. Arno Carl Fieldner, U.S. Bureau of Mines. As Dr. Fieldner cannot be present, the Medal will be accepted on his behalf by the United States Embassy, who will forward it to him. The Melchett Lecture, entitled "The Analysis and Testing of Coal in Relation to its Properties and Utilisation," will be delivered in the form of a talking film.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Notice of Intended Dividend

ROSS, JAMES WALTER EDWARD, 42 Bushey Way, Park Langley, Beckenham, Kent, hydrological chemist. Last day for receiving proofs, October 2. Trustee: Arthur Harold Ward, 29 Russell Square, W.C.1. Official Receiver.

Company News

Vickers, Ltd., are paying an interim dividend of 4 per cent. (same).

The Leeds Fireclay Co., Ltd., announces a profit of £10,877 for the year ended June 30 (£9208). No dividend is being paid on the 6 per cent. non-cumulative participating preference shares (same).

The Eaglescliffe Chemical Co., Ltd., have declared a dividend of 3 per cent. on the 6 per cent. cumulative preference shares for the half-year ending September 30, making 6 per cent. for the year (same).

The directors of **Imperial Chemical Industries, Ltd.,** announce that they have declared, as at September 29, for the year ending December 31, 1942, an interim dividend of 3 per cent. actual on the ordinary stocks, payable (less U.K. income tax reduced by Dominion income tax relief) on December 1.

New Companies Registered

A. Philip, Ltd. (375,583).—Private company. Capital: £1000 in 1000 shares of £1 each. Manufacturers of and dealers in chemicals, drugs, disinfectants, fertilisers, oils, colours, etc. Directors: L. W. Holmes, Albert Philip. Registered office: 365 Regents Park Road, N.W.3.

Chalk Products, Ltd. (376,055).—Private company. Capital: £5000 in 5000 shares of £1 each. Manufacturers of and dealers in fertilisers, animal feeding stuffs, chalk, lime, cement, concrete, plaster, building materials, etc. Subscribers: P. F. Money and Reginald Harris, both of 3-4 Clements Inn, W.C.2.

John M. Cairns and Co., Ltd. (376,067).—Private company. Capital: £5000 in 5000 shares of £1 each. Manufacturers of and dealers in chemicals, minerals, drugs, oils, colours, etc. Subscribers: C. M. Gourvish, Little House, Cobham, Surrey; Florence Willshire.

General Trade and Chemical Exports Co., Ltd. (376,101).—Private company. Capital: £300 in 300 shares. Merchants, brokers, agents, shipbrokers, carriers, manufacturers, chemists, druggists, drysalters, oil and colourmen, manufacturers of and dealers in medicinal, industrial and other preparations, essential oils, etc. Directors: S. T. Rhodes, Mrs. Emma M. Majzner. Registered office: 27 Jubilee Place, S.W.3.

Chemical and Allied Stocks and Shares

THERE has been only a moderate amount of business passing in Stock Exchange markets, where sentiment was again governed by the general tendency to await the next turn in the war news from Russia. Nevertheless, in the absence of selling, the undertone was again steady, and in most industrial securities, movements on balance have not exceeded more than a few pence.

Although "ex" the maintained interim dividend of 3 per cent., Imperial Chemical at 33s. 6d. were unchanged on balance. The market remains confident that the total payment for the year is likely to be kept on an 8 per cent. basis. I.C.I. 7 per cent. preference were steady at 33s. 6d. Following last week's transactions up to the enhanced level of 70s., B. Laporte shares, which remain firmly held, have had a wide quotation of 66s. 3d.—71s. 3d. British Drug Houses were again 18s. 9d., and business around 12s. continued to be shown in Goodlass Wall 10s. shares. The units of the Distillers Co. were firm at 79s. 3d.; the yield on the basis of last year's 16¼ per cent. dividend is small, but this has to be read in relation to the company's excellent dividend record over a long period of years and the very strong balance-sheet position. Aided by the good impression created by the financial results and annual statement, Courtaulds moved up, and are 39s. 9d. at the time of writing, the highest level recorded for the shares since 1938. British Celanese issues and shares of other rayon companies also showed better prices, and moderate improvement was made in Bradford Dyers ordinary and preference, awaiting the annual results.

Lever & Unilever, although now "ex" the 5 per cent. dividend, were 29s. or within 3d. of the price ruling a week ago. Elsewhere, there was improvement to 29s. 9d. in Dunlop Rubber. Although still under the influence of the lower profits shown by the preliminary statement, Triplex Glass were little changed on balance at 29s. 10½d., pending the full results and the chairman's annual statement. United Glass Bottle have transferred around 55s. 6d. and Canning Town Glass 5s. shares were dealt in at 6s. 1½d. at one time. There were again a fair number of dealings among shares of concerns interested in plastics, but all recent gains were not fully held. Awaiting the annual results, Erinoid 5s. ordinary have transferred around 10s. 3d. at the time of writing. Business in Lacrinoid Products 2s. shares was around 4s. 4½d. and in British Industrial Plastics

around 4s. 9d. Dealing in Thomas De La Rue ranged from 57s. 3d. to 58s. 3d. In other directions, British Glues 4s. shares were dealt in at 6s. 6d., and Catalin shares at 2s. 9d. Morgan Crucible first preference transferred at 25s. 9d. at one time. Elsewhere, Greeff Chemicals 5s. shares were 5s. 9d.; the interim dividend declaration is due next month.

Borax Consolidated maintained a steady tendency at 33s., as did British Match at 36s. 9d. United Molasses were well maintained at 29s. 9d.; the interim dividend is due in a few weeks. Barry & Staines held last week's rise to 35s., and Nairn & Greenwich were maintained at 53s. 9d. Turner & Newall were firm at 68s. 3d., as were British Aluminium at 45s., and British Oxygen at 67s. 9d. General Refractories eased a few pence to 12s. 3d., and Imperial Smelting were again 12s. 1½d. W. J. Bush shares, which are firmly held, were 45s., and Cellon 5s. shares around 16s. Lawes Chemical were quoted at 8s. 9d. "middle." Elsewhere, Boots Drug were steady at 37s. 3d., Sangers 17s. 7½d., and Timothy Whites 22s. 7½d. Only small movements were shown in iron and steel issues, with Stewarts & Lloyds 49s., United Steel 23s. 7½d., and Tube Investments 87s. 6d. Oil shares moved better, having remained under the influence of recent dividend announcements.

British Chemical Prices

Market Reports

CONDITIONS in the general chemicals market have continued active during the past week and the movement into consumption, mostly against contracts, has been fairly substantial. A routine trade continues to operate in the soda products section, and nearly all items are moving steadily into consumption, with the supply position of prussiate, chlorate, and bichromate of soda unchanged. Offers of small parcels of yellow prussiate of potash are quickly absorbed and available quantities of caustic potash and carbonate of potash are readily taken up by approved buyers. Elsewhere in this section permanganate of potash continues in strong request. Formaldehyde is a firm market on a substantial buying interest and a steady trade is being put through for white powdered arsenic, while red and white lead are reported to be in good demand. There is little to report from the coal-tar products market, conditions remaining much the same as reported last week.

MANCHESTER.—Steady to firm price conditions have been reported during the past week in all sections of the Manchester chemical market and the tendency in several instances appears to be towards higher levels, although actual changes on balance have been few. Alkali products in general are going steadily into consumption, and there is a fair demand for the ammonia and magnesia compounds, and also for the heavy acids. With regard to the tar products, the majority of these are finding a ready market both in the light and heavy sections, and values are well maintained.

GLASGOW.—Business in the Scottish heavy chemical trade was quiet last week both for home and export. Prices remain very firm. Supplies of certain articles are becoming more difficult owing to the delay in deliveries and other causes.

Price Changes

Mercury Products.—Controlled price for 1 cwt. quantities: Bichloride powder, 15s. 8d.; bichloride lump, 16s. 3d.; ammon. chloride powder, 17s. 10d.; ammon. chloride lump, 17s. 8d.; mercurous chloride, 18s. 7d.; mercury oxide, red cryst., 20s. 9d.; red levig., 20s. 3d.; red tech., 19s. 11d.; yellow levig., 20s. 2d.; yellow tech., 19s. 7d.; sulphide, red, 17s. 9d.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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These cements are supplied in two grades of fineness, 40 and 60, and replace materials formerly imported

*

The Thermal Syndicate Ltd.

▣

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WALLSEND, NORTHUMBERLAND

▣

London Depot:
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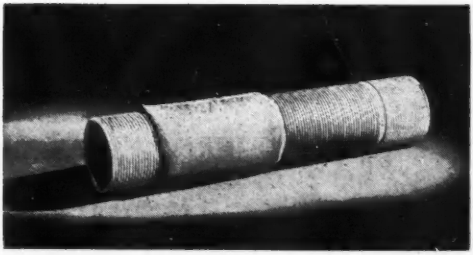


MINISTRY OF WORKS & PLANNING

COMPULSORY DISCLOSURE OF SCRAP METAL

(*Defence* (*General*) *Regulations*, 1939, *No.* 56AAA. *S. R. & Os.* 1942, *Nos.* 761 *and* 1723)

YOUR RETURNS MUST BE FORWARDED BY 21st OCT.

THE OCCUPIER OF EVERY PREMISES in Great Britain must furnish to the Ministry of Works and Planning a return of any accumulation on those premises of 3 tons or more of metal suitable for scrap. Returns must be made on the prescribed form *within 30 days of the 21st September, 1942*, or of any subsequent day on which such an amount of metal suitable for scrap is brought on to the premises.

Metal is deemed suitable for scrap if it is, or forms part of, any building, structure, machinery, plant or article which is disused, obsolete or redundant, or otherwise serving no immediate purpose.
The metal to which the Order relates is *any metal* other than aluminium, magnesium and alloys of either of them.

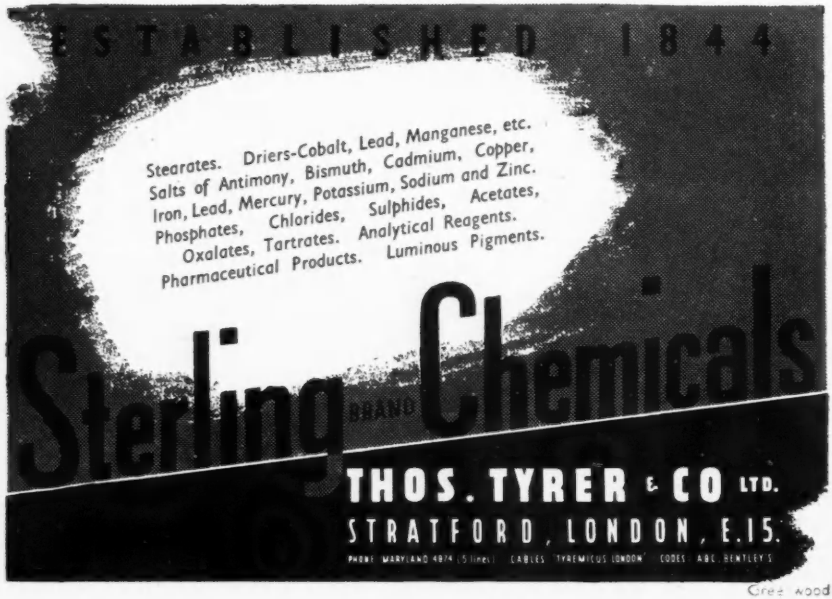
Under the Order "Premises" means any building or land having an assessment under Schedule 'A' or subject to a valuation for rating.
Failure to make the required return renders a person liable to the penalties prescribed by Defence Regulation 92 (fine, imprisonment, or both).

In the case of empty premises the person entitled to occupy those premises has to make the return.

Returns are NOT required where :—

(*i*) A return has already been made from premises in those areas specified in the Scrap Metal (No. 1) Order, S. R. & O. 1942, No. 761.
(*ii*) The Board of Trade or the Ministry of Food certify that the metal is, or forms part of, machinery or plant which is disused or spare in consequence of a concentration scheme approved by either of them.
(*iii*) The metal forms part of a machine tool of any of the descriptions specified in the first schedule to the Control of Machine Tools (No. 9) Order, 1941, or a cutting tool of any of the descriptions specified in the first schedule to the Control of Machine Tools (Cutting Tools) (No. 1) Order, 1942, or any order replacing or amending them.
(*iv*) Returns in respect of the metal are already made to the Iron and Steel Control under the Industry (Records and Information) No. 1 Order, 1940 or No. 2 Order, 1942.
(*v*) The metal forms part of stand-by plant or equipment held by Public Utility Undertakings and is essential for the performance of the statutory obligations of those undertakings or which is held by them for the purposes of Sections 40, 42, 59 or 60 of the Civil Defence Act, 1939.

★ **FORMS on which returns must be made are obtainable from the Director of Demolition and Recovery (Scrap Metal Order), Sanctuary Buildings, Great Smith Street, London, S.W.1.**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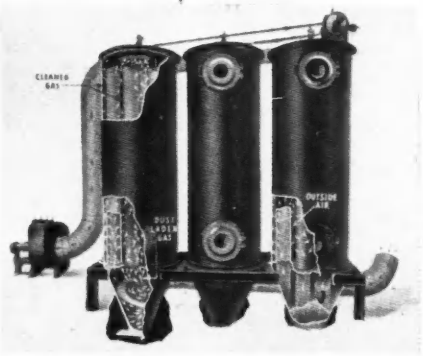

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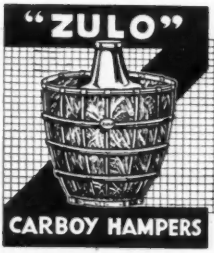

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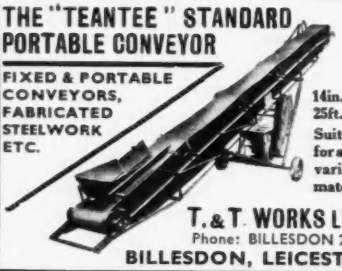
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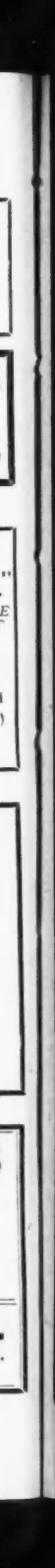

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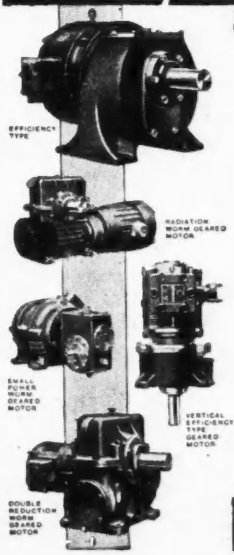
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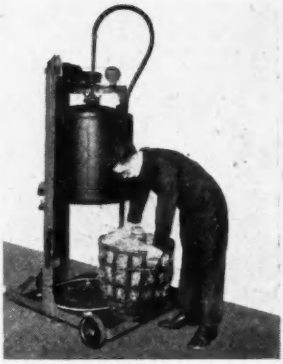

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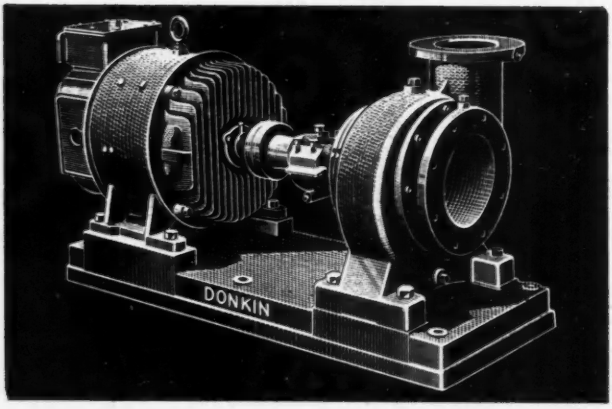

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